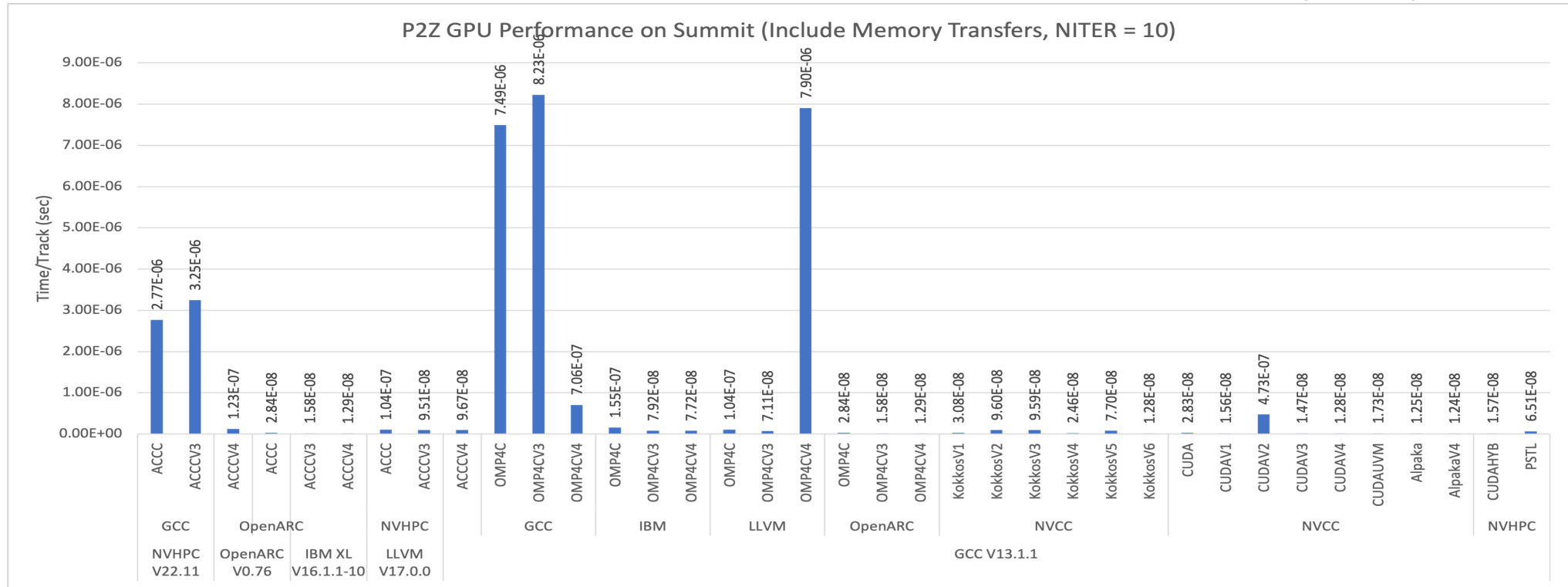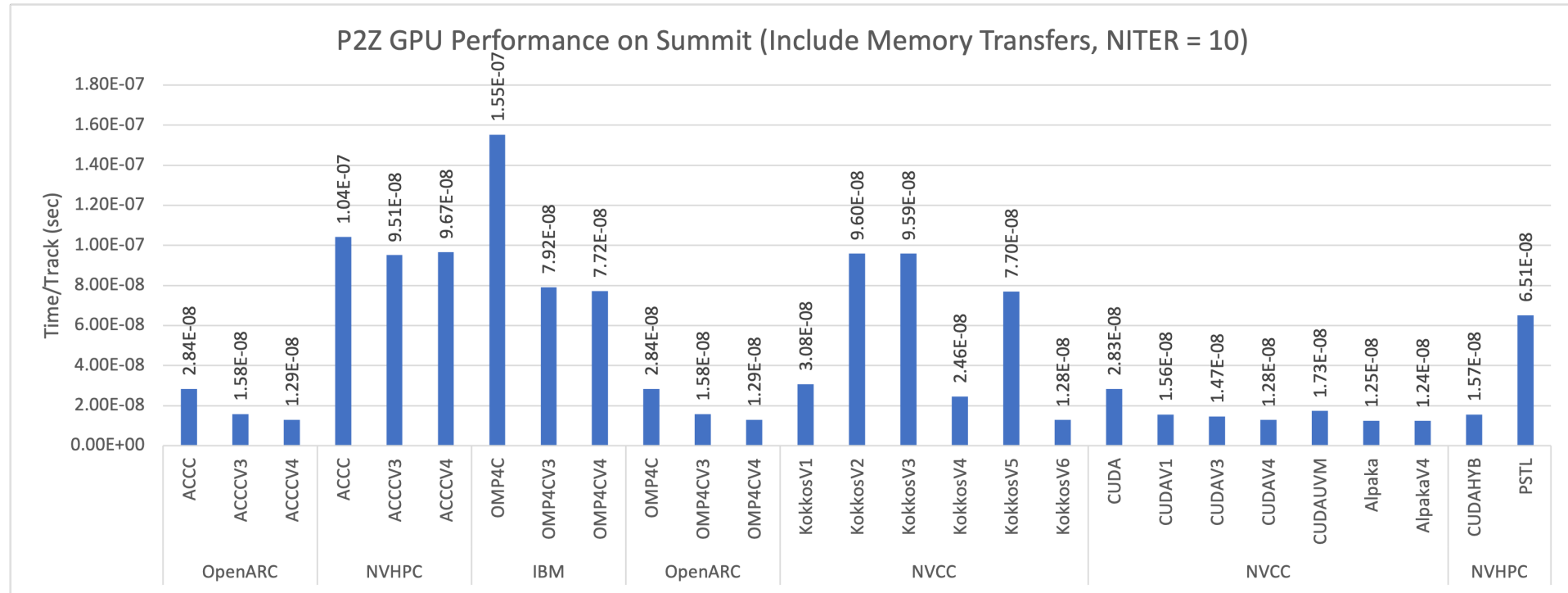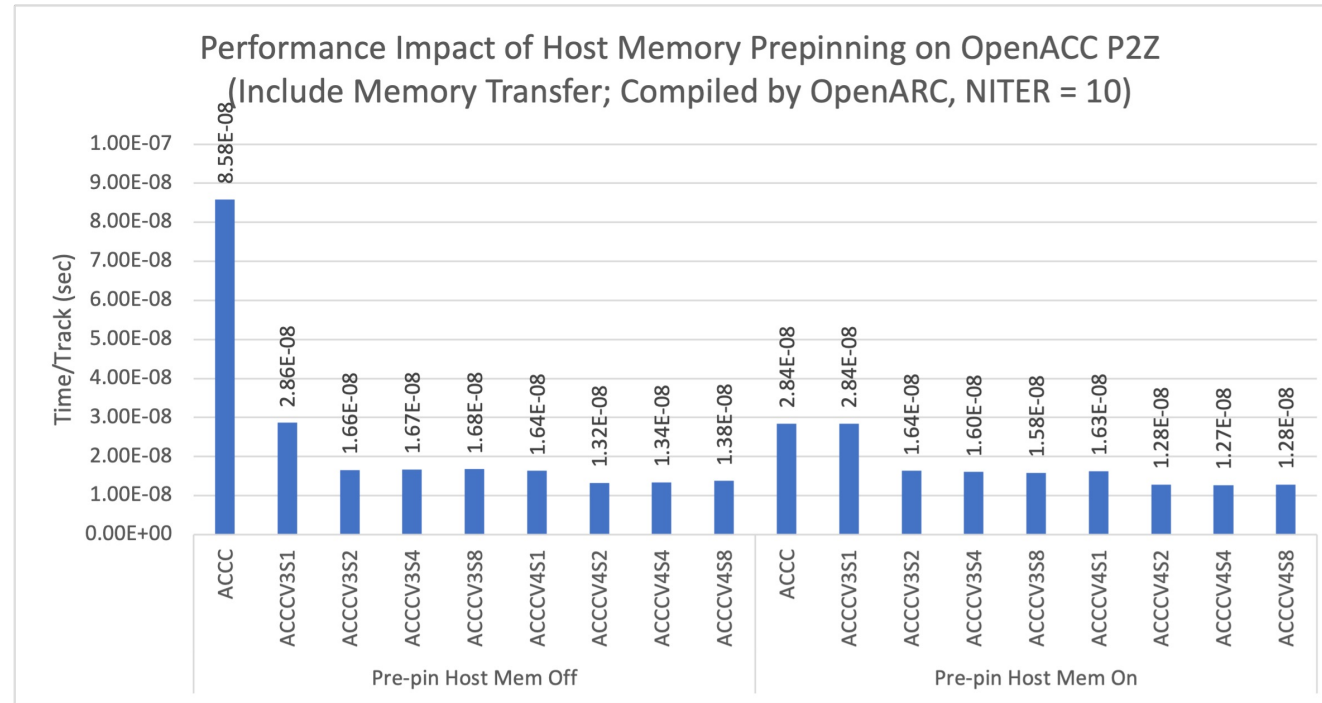# GPU Performance of P2Z on Summit (All)

- Array-Of-Structures-Of-Arrays (AOSOA), UVM (repeated prefetch), Batched shared data on Shared Memory, Async: CUDA
- AOSOA, UVM (repeated prefetch), Thread-private data on Local Memory, Async: CUDAV1, CUDAUVM (C++)
- AOSOA, Batched shared data on Local Memory, Async: CUDAV2
- AOSOA, Batched shared data on Shared Memory, Async: CUDAV3, ACCCV3, OMP4CV3, KokkosV3 (single default stream), KokkosV4 (pre-pin, multi-streams), Alpaka
- AOSOA, Batched shared data on Shared Memory, Sync: ACCC, OMP4C
- AOSOA, Thread-private data on Local Memory, Async: CUDAV4, CUDAHYB, PSTL, ACCCV4, OMP4CV4 , KokkosV5 (single default stream), KokkosV6 (pre-pin, multi-streams), AlpakaV4
- Structure-Of-Arrays (SOA), UVM (no prefetch), Batched shared data on Shared Memory, Async (single default stream): KokkosV1
- SOA, Batched shared data on Shared Memory, Async (single default stream): KokkosV2
- All OpenARC-compiled OpenACC/OpenMP4 versions are explicitly pre-pinned.
- All asynchronous versions except for KokkosV3 and KokkosV5 use 10 streams.

GPU Performance of P2Z on Summit (Subset)

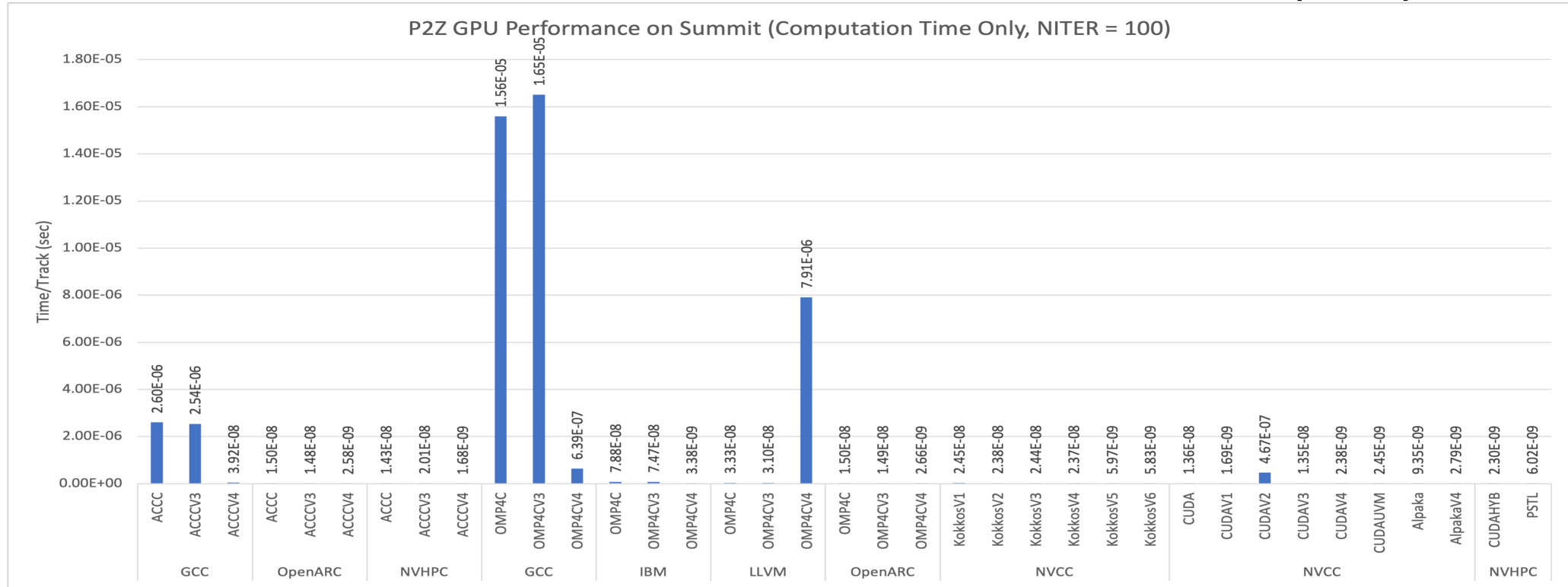P2Z GPU Performance on Summit (Include Memory Transfers, NITER = 10)

- Array-Of-Structures-Of-Arrays (AOSOA), UVM (repeated prefetch), Batched shared data on Shared Memory, Async: CUDA
- AOSOA, UVM (repeated prefetch), Thread-private data on Local Memory, Async: CUDAV1, CUDAUVM (C++)
- AOSOA, Batched shared data on Local Memory, Async: CUDAV2
- AOSOA, Batched shared data on Shared Memory, Async: CUDAV3, ACCCV3, OMP4CV3, KokkosV3 (single default stream), KokkosV4 (pre-pin, multi-streams), Alpaka
- AOSOA, Batched shared data on Shared Memory, Sync: ACCC, OMP4C
- AOSOA, Thread-private data on Local Memory, Async: CUDAV4, CUDAHYB, PSTL, ACCCV4, OMP4CV4 , KokkosV5 (single default stream), KokkosV6 (pre-pin, multi-streams), AlpakaV4
- Structure-Of-Arrays (SOA), UVM (no prefetch), Batched shared data on Shared Memory, Async (single default stream): KokkosV1
- SOA, Batched shared data on Shared Memory, Async (single default stream): KokkosV2
- All OpenARC-compiled OpenACC/OpenMP4 versions are explicitly pre-pinned.
- All asynchronous versions except for KokkosV3 and KokkosV5 use 10 streams.

Performance Impact of Host-Memory Pre-pinning on OpenACC P2Z

Performance Impact of Host Memory Prepinning on OpenACC P2Z
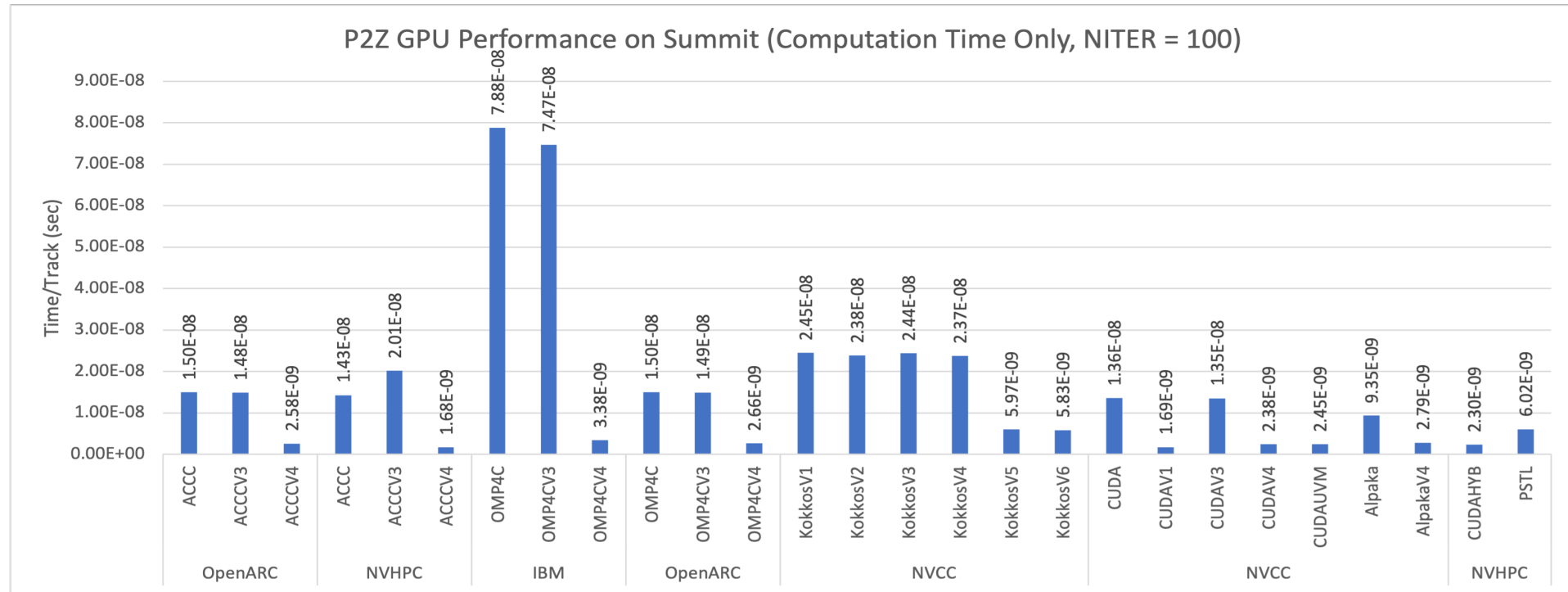(Include Memory Transfer; Compiled by OpenARC, NITER = 10)

- ACCC: AOSOA, Batched shared data on Shared Memory, Sync
- ACCCV3: AOSOA, Batched shared data on Shared Memory, Async
- ACCCV4: AOSOA, Thread-private data on Local Memory, Async
- When Host-Memory-Pre-pinning is on, all the host data appearing on OpenACC data clauses are pre-pinned.
- All asynchronous versions pre-pin the host memory before each asynchronous memory transfer if it is not already pre-pinned (on-demand host-memory pre-pinning)

GPU Performance of P2Z on Summit (All)

P2Z GPU Performance on Summit (Computation Time Only, NITER = 100)

- Array-Of-Structures-Of-Arrays (AOSOA), UVM, Batched shared data on Shared Memory, Async: CUDA
- AOSOA, UVM, Thread-private data on Local Memory, Async: CUDAV1, CUDAUVM (C++)
- AOSOA, Batched shared data on Local Memory, Async: CUDAV2
- AOSOA, Batched shared data on Shared Memory, Async: CUDAV3, ACCCV3, OMP4CV3, KokkosV3 (single default stream), KokkosV4 (pre-pin, multi-streams) , Alpaka
- AOSOA, Batched shared data on Shared Memory, Sync: ACCC, OMP4C
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- Structure-Of-Arrays (SOA), UVM, Batched shared data on Shared Memory, Async (single default stream): KokkosV1
- SOA, Batched shared data on Shared Memory, Async (single default stream): KokkosV2
- All OpenARC-compiled OpenACC/OpenMP4 versions are explicitly pre-pinned.
- All asynchronous versions except for KokkosV3 and KokkosV5 use 10 streams.

GPU Performance of P2Z on Summit (Subset)

P2Z GPU Performance on Summit (Computation Time Only, NITER = 100)

- Array-Of-Structures-Of-Arrays (AOSOA), UVM, Batched shared data on Shared Memory, Async: CUDA
- AOSOA, UVM, Thread-private data on Local Memory, Async: CUDAV1, CUDAUVM (C++)
- AOSOA, Batched shared data on Local Memory, Async: CUDAV2
- AOSOA, Batched shared data on Shared Memory, Async: CUDAV3, ACCCV3, OMP4CV3, KokkosV3 (single default stream), KokkosV4 (pre-pin, multi-streams) , Alpaka
- AOSOA, Batched shared data on Shared Memory, Sync: ACCC, OMP4C
- AOSOA, Thread-private data on Local Memory, Async: CUDAV4, CUDAHYB, PSTL, ACCCV4, OMP4CV4 , KokkosV5 (single default stream), KokkosV6 (pre-pin, multi-streams), AlpakaV4
- Structure-Of-Arrays (SOA), UVM, Batched shared data on Shared Memory, Async (single default stream): KokkosV1
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